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## ABSTRACTS
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(Pages refer to the Japanese originals of this volume unless otherwise noticed)

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### Feeding Experiments with Amino Acid Mixture (II).

On the Nutritive Value of Alanine.

(pp. 749~751)

By Siro MAEDA, Tuneto HIGASI and Hitosi MATUOKA.
(The Institute of Physical and Chemical Reserch. Received June 30, 1937.)

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### Studies on the Enzymes of Lactic Acid Bacteria. (Part I).

On Fumarase of Lactic Acid Bacteria.

(pp. 752~756)

By Kakuo KITAHARA and Hideo KATAGIRI.
(Department of Agriculture, Kyoto Imperial University.
Received May 26, 1938.)

In the previous paper [This Journal **14**, 645 (1938)], the authors found fumarase in Lactobacillus plantarum. In the present paper, experiments were carried out with dried cells of various kinds of lactic acid bacteria, in order to ascertain the occurrence of fumarase in these cells.

The presence of fumarase was verified with L. plantarum, L. pentoaceticus, L. brevis and L. casei, while fumarase was not detected in the cells of L. Sake, Streptc. lactis and Leuc. mesenteroides var. Sake.

The occurrence of fumarase did not coincide with the known natures of the bacteria: forms of the cells, manners of decomposition of glucose, optical properties of lactic acid being produced or the occurrence of racemiase. Therefore, detection of fumarase would be useful for the classification of lactic acid bacteria.

Only *l*-component of malic acid was dehydrated by the fumarase of these bacterial cells when *dl*-acid was chosen for the substrate.

With various kinds of bacterial cells, the equilibrium quatient Q = *l*-malate/fumarate, was always found to be 3.3 at 30° C and in pH = 7.4, although the velocity of the reversible reaction between *l*-malate and fumarate was varried noticeably with the kinds of bacteria.

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## Synthesis and Hofmann's Decomposition of Certain Alkaloids of Aporphine Type (Derivatives of Domesticine).

(pp. 757~778)

By Hideo SHISHIDO.

(Chemical Laboratory, Kitasato Institute. Received May 16, 1938.)

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## Studies on the Action of Arginase on Canavanin and Arginine II.

### The Marked Difference of the Influence of Manganese, Salt and Ferrous Salt upon the Action of Arginase on Canavanin and Arginine.

(pp. 779~790)

By Matsunosuke KITAGAWA and Tsuneki WATANABE.

(Biochemical Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka. Received May 23, 1938.)

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## On the Acidity and Exchangeable Lime Content of Good Tea Farm Soil in Japan.

(pp. 791~798)

By R. KAWASHIMA.

(Agr. Chemical Laboratory, The Kyushu Imp. University. Received May 28, 1938.)

Twenty five surface- and nine subsoils of good tea farms of different geological origin in Japan were collected and their acidity and exchangeable lime were determined. According to this examination, the seventy percent of surface soils collected have the pH-value higher than 5.0 and the sixty percent of them have the exchangeable lime content of less than 0.1%. It is a noticeable fact that the tea plant makes a good growth on such an acid mineral soil deficient in exchangeable lime as:— pH 3.74, Daikuhara acidity 165.4, hydrolytic acidity 64.3, and exchangeable lime 0.040%. The analytical data of air-dried fine soils are summarized as follows:

The acidity and exchangeable lime content

| | | pH | | Daikuhara acidity | Hydrolytic acidity | Exchangeable lime |
|---|---|---|---|---|---|---|
| | | $H_2O$ | KCl | $(y_1 \times 3)$ | $(y_1)$ | % |
| Surface soil | Max. | 5.96 | 5.18 | 165.4 | 64.3 | 0.016 |
| | Min. | 3.74 | 3.25 | 0.4 | 15.5 | 0.269 |
| | Ave. | 5.07 | 4.33 | 31.4 | 34.9 | 0.089 |
| Subsoil | Max. | 6.97 | 5.75 | 173.6 | 62.8 | 0.011 |
| | Min. | 3.71 | 3.22 | 0.4 | 4.5 | 0.209 |
| | Ave. | 5.53 | 4.67 | 29.4 | 19.7 | 0.089 |

## Influence of Three Essential Elements (N. P. K) on the Yield and Quality of the Cucumber.

(pp. 799∼804)

By Chikafumi ICHIKAWA.

(The Soma Agricultural and Sericultural School. Receied May 19, 1938.)

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## On the Content of 0.2 *N* HCl Soluble Potash in Tyosen Soils. (II).

(pp. 805∼823)

By Dr. MISU Hideo.

(Agricultural Experiment Station Government General of Tyosen.
Received Apr. 21, 1938.)

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## Comparative Studies on the Strains of Wine Yeast, indigenous to Japan and other Countries, for Wine Making.

(pp. 824∼828)

By Tatuitiro INOUE.

(Agricultural Chemical Laboratory, Faculty of Agriculture,
Imperial University of Tokyo. Received June 7, 1938.)

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## On the Koji-Amylase.

### Part X.—On the Behaviours of α-, β-amylases and of Maltase to various external Conditions.

(pp. 829∼838)

By Yuzo TOKUOKA.

(Tsunekichi Okura Brewery. Received May 24, 1938.)

α-Amylase of koji (Asp. oryzae grown on steamed rice) was totally destroyed by the following treatments, therefore the liquids being contained β-amylase and maltase were easily prepared:

(1) The aqueous extract of koji was precipitated by alcohol. The aqueous solution of the precipitate was adjusted to pH=2.5 and then kept for 30 minutes at 40°.

(2) The aqueous solution was adjusted to pH=4.5 and kept for 24 hours at 40°

(3) The aqueous solution was adjusted to pH=6.1 and kept for 30 minutes at 80°.

Among these treatments, only the 3rd method was found to be not applicable for commercial Taka-diatase preparations.

The optimum and the ranges of pH value of α-, β-amylases and of maltase for the decomposition of the substrates were found to be 5.1~5.5 (2.5~9.5), 4.5~5.0 (ca. 1.5~10.0) and 3.2~4.1 (ca. 1.5~9.5) respectively.

As was shown in the treatments above mentioned, α-amylase was found to be very sensitive to both acid and temperature. The optimum and the ranges of pH values for the stability of the enzymes were observed to be different.

(i) When the enzyme solution was kept for 20 hours at 40°, the optimum pH values of α- and β-amylases for the stability were determined to be 7.0~7.5 and 5.2~6.6. For maltase, the pH values were found to be very much the same as β-amylase.

(ii) When the enzyme solution was kept for 30 minutes at 40°, α-amylase was remarkably inactivated at any pH value between 2.5~11.0, while β-amylase was at last destroyed at such higher alkality as pH=12.0.

It is very remarkable that β-amylase was very stable to acid, since its activity was still remained partly, in its 0.5 *N* HCl solution treated as was mentioned above. Maltase again revealed very much the same behaviour to acid and alkali as was observed with β-amylase, but the former was appeared to be slightly inferior to the latter.

(iii) When the enzymes were compared at their optimum pH values for stability, α-amylase was completely destroyed by heating at 70° for 30 minutes, while β-amylase and maltase could fairly resisted for boiling (100°) for 30 minutes.

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## On the Koji-Amylase.

### Part XI.—Effect of Koji-materials on the Production of Amylases and Maltase.

(pp. 839~842)

By Yuzo Tokuoka.

(Tsunekichi Okura Brewery. Received May 24, 1938.)

For Koji-materials, polished rice, soy-bean, rice- and wheat brans were chosen. The same strain of Asp. oryzae was grown on these various materials.

With distilled water, amylases and maltase were easily extracted from all the koji-preparations, while the extraction of α-amylase in plished rice-koji preparation was found to be greatly limited unless salt solution was employed instead of water, as was already pointed out in the previous paper.

When the amounts of β-amylase and maltase were compared with the amount of α-amylase, the ratio was, in each case, found to be about 10 times higher with polished rice-koji than the other koji-preparations and taka-diastase.

This remarkable difference would be several times diverged when aqeous extracts were chosen for comparison.

The characteristic nature of polished rice-koji being contained comparatively small amount of α-amylase, was suggested to be suitable for preparing of koji and for the process of Sake-manufacture.

## Effect of Salts in Water for the Silk-Reeling on the Colour and Lustre of Raw Silk.

### Part I.—On the Salts in Waters for Cooking and Reeling of Cocoons.

(pp. 843∼848)

By Tosio NAKAHAMA and Shun-iti NISIMURA.

(Laboratory of Kanebo Silk Factory, Hikone, Siga. Received June 1, 1938.)

The dilute aqueous solutions of 27 kinds of salts including iron, copper, alminium, calcium, magnesium, sodium and potasium salts were chosen for the present experiments.

The colour (white, black and colour contents) and the lustre (degree of gloss) of the raw silk reeled with these salt solutions were determined by Pulfrich-photometer.

When very dilute solutions (0.001 or 0.0001%) were used, no remarkable effect on colour of the raw silk was produced by any of these salts.

However, white content of raw silk was found to be decreased remarkably by iron and copper, fairly by alminium and slightly by calcium salts, when 0.01% aqueous solutions were employed.

It is suggested that the effect of salt on the colour of raw silk would be produced by the adsorption of cations of the raw silk, since the amount of fat and sericin in raw silk did rot coincide to the colour of the raw silk.

The degree of gloss of raw silk was observed to be directly proportional to the amount of fat or to the loss of sericin by reeling, but the effect of cations or anions on the lustre was found to be at random.

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## Effect of Salts in Water for the Silk-Reeling on the Colour and Lustre of Raw Silk.

### Part II.—Effect of Salts on the Colour and Lustre of Raw Silk.

(pp. 849∼853)

By Tosio NAKAHARA and Shun-iti NISIMURA.

(Laboratory of Kanebo Silk Factory, Hikone, Siga. Received June 1, 1938.)

Raw silk was treated directly in the same manners and with the same kinds of salt solutions as were emploped in the previous paper (Part I).

The effect of iron salts on the white content was found to be more remarkable and then copper, alminium and calcium salts were found respectively to produce nearly the same effects as were observed in the previous paper.

The lustre of raw silk was again observed to be directly proportional to the amount of fat or to the loss of sericin during the treatment, and the effect of salts on the colour of raw silk was suggested to be produced by the adsorption of cations on the raw silk.

## Alcohol Manufacture from Potatoes (V).

### Preliminary Treatments of Potatoes on Semi-industrial Scale.

(pp. 854~858)

By K. SATOH, K. HAYASI and A. MATUMI.

(Institute of Hokkaido Industrial Experiment Station. Received June 5, 1938.)

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## Alcohol Manufacture from Potato (VI).

### Studies on Pressed Juice (I).

(pp. 859~867)

By T. YOSIMACHI and Y. ŌTAKU.

(Hokkaido Industrial Experiment Station. Received June 15, 1938.)

Observations of its practical yields from potato, discussions upon the quantities of its utilizable constituents and experiments on its behaviour esperially concerning pH migration when mixed with acid-sugar mash filtrate, shows the fact that the pressed juice of potato, either raw or boiled, possessing a significant value as the supplemental source of fermentative substances and also as an excellent adjuster for the mash-pH, must be managed carefully in its preparation and be added back to the mash before the fermentations.

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## Alcohol Manufacture from Potato. (VII).

### Acclimatization of Yeast in Acid-sugar Mash.

(pp. 868~872)

By T. YOSIMACHI.

(Hokkaido Industrial Experiment Station. Received June 15, 1938.)

Not only its type of preparation is characteristic but also as a substance which was not yet intimated with ordinary cultured-yeast, it is rather presumable that the acid-sugar mash must never be an easily fermentable material. Experiments also showing the similar results, the selection of a befitting mother yeast comes in necessity as the fundamental problem of this fermentation.

The acclimation, starting from Sacch. Thermantitonum 792, in the acid-sugar mash filtrate under the addition (9~vol%) of rice bran extracts, was elavorated in 2 series each of 25 generations. The steadious progress of yeast condition was recorded. In final stage the fermentation period was reduced somewhat to 46 hrs. (the time contraction corresponding 1/2 of the initial stage or 1/3 of the original culture), and the application of this mother culture enabled the performance of each fermentation also in semi-industrial scale.

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## A Study in the Mannitol-Forming Bacteria.

By Shin-ichiro BABA.

(pp. 873~894)

(Agricultural Chemical Laboratory, Tokyo Imp. Univ. Received May 28, 1938.)

The writer isolated thirty varieties of the manintol-forming bacteria from fruits, various dried goods, milk and its manufactured articles, pulses, cereals and vegetables, and proceeded to investigate their morphological and physiological properties to determine their positions in the taxonomy. Moreover, the writer made clear various culture-conditions for production of mannitol, with respect to the much mannitol-forming bacteria and tried to produce mannitol from the Jerusalem artichoke. The outline of the investigation runs as follows.

(1) The bacteria were isolated from as various kinds of materials as possible: fruits (bananas, apples, persimmons, pomegranates, pears, strawberries, grapes etc.), dried goods (dried pieces of sweet patatoes, dried fishes, dried tangles, dried mushrooms etc.), milk and its manufactured articles (butter, cheese etc.), pulses, cereales (wheat, barley, green malt, rye etc.) and vegetables (potatoes, tomatoes etc.). According to the writer's experiment, the mannitol-forming bacteria are distributed most plentifully in fruits generally, and then in milk, dried goods etc. So it is better chosen to take the fruits in general for the origin of these bacteria by cultivating them at about 30°C.

(2) The classification of the separated bacteria was made after the Orla-Jensen's classification. They are determined to belong to Pseudo-lactic acid bacteria or True-lactic acid bacteria, according to their having abilities of decomposing $H_2O_2$ and reducing nitrate or not. And moreover, their positions in the classification are also determined according to their morphological and physiological properties.

A) True-lactic acid bacteria
  (a) Streptobacterium plantarum varieties
    $B_3$, $B_6$, $R_1$, $IA_3$, $AN_1^{\circ}$
  (b) Betabacterium breve varieties
    $I_1$, $B_4$, $AN_4^{\circ}$
  (c) Betabacterium caucasicum varieties
    $Z_3$, $KA_3^{\circ}$
  (d) Betacoccus arabinaceus variety
    $B_5$

B) Pseudo-lactic acid bacteria
  (a) Microbacterium lacticum varieties
    $B_1$, $B_2$, $R_2$, $PM_3$.

(3) The relation between the separated bacteria and their mannitol forming abilities runs as follows:

| $\frac{\text{Mannit}}{\text{Sugar consumed}} \times 100$ | 10~30% | 30~40% | 40~50% | 50~60% | Total |
|---|---|---|---|---|---|
| Streptobacterium plantarum var. | 2 strains | 1 strain | 1 strain | 1 strain | 5 strains |
| Betabacterium breve var. | | 2 strains | 1 strain | | 3 strains |
| Betabacterium caucasicum var. | 1 strain | 1 strain | | | 2 strains |
| Betacoccus arabinaceus var. | | | 1 strain | | 1 strain |
| Microbacterium lacticum var. | 2 strains | 1 strain | 1 strain | | 4 strains |

Judging from the above result, the order of mannitol-forming ability is as follows:

( i ) Streptobacterium plantarum variety.
(ii) Betabacterium breve variety.
(iii) Betacoccus arabinaceus variety.
(iv) Microbacterium lacticum variety.
( v ) Betabacterium caucasicum variety.

(4) The quantitative relation between mannitol and total acids is represented by the next equation.

$$y = -0.403\,x + 3.165\,,$$

where $x$ is the weight (g) of mannitol and $y$ (g) total acids as lactic acid.

As the result of calculation, the probability of applying the equation for mannitol and total acids is 60 per-cent, and the probable error is ±0.120. Quoting the above formula, the total acids are approximately guessed from mannitol.

(5) Among these bacteria, $IA_3$ and $B_1$, which produce a great deal of mannitol, have the optimum $pH = 6.6 \sim 6.8$ for the fermentation.

(6) For the same bacteria, the optimum concentration of sugar in mash is $8 \sim 11\%$.

(7) In the range of $pH = 4.4 \sim 7.0$, the lower is the value of pH, the shorter become the days necessary for the production of maximum quantity of mannitol. The days necessary for fermentation are unlike owing to the species of bacteria and their culture-conditions. When pH is 6.8 and the concentration of sugar is $11\%$, $6 \sim 9$ days are necessary for production of maximum quantity of mannitol.

(8) The quantity of mannitol produced in the mixed culture media of two species of bacteria is less than that produced by the bacterium of the two, which produces much more mannitol, and more than that by the other.

(9) About $3\%$ mannitol was produced in the saccharified solution of Jerusalem artichoke. 60 g of mannitol were got from 2 kg of the raw materials.

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# Experimentelle Untersuchung über die Wirkung von Radium und Röntgen-Strahlen auf die Gärungsmikroorganismen (I Mitt.)

Auf die morphologischen und biochemischen Eingenschaften der Radium-Rassen des *Aspergillus niger*.

(ss. 895∼910)

Von R. NAKAZAWA und M. SIMO.
(The Depertment of Industry, Government Research Institute, Taiwan, Japan. Received June 4, 1938.)